

## CORRESPONDENCE

# Nomenclatural validation of new genera and species of the superfamily Psychopsoidea (Insecta: Neuroptera) from the mid-Cretaceous amber of Myanmar

Xiumei Lu<sup>1</sup>, Weiwei Zhang<sup>2</sup>, Xingyue Liu<sup>1\*</sup>

<sup>1</sup>Department of Entomology, China Agricultural University, Beijing 100193, China

<sup>2</sup>Three Gorges Entomological Museum, P.O. Box 4680, Chongqing 400015, China

\*Corresponding author, E-mail: xingyue\_liu@yahoo.com

**Abstract** Two new genus-group names and two new species-group names of the lacewing superfamily Psychopsoidea from the mid-Cretaceous amber of Myanmar are herein validated, namely *Fiaponeura penghiani* **gen. & sp. nov.** and *Burmopsychops limoae* **gen. & sp. nov.**

**Key words** Neuropterida, Psychopsoidea, Burmese amber, new taxon, nomenclature.

The neuropteran superfamily Psychopsoidea currently comprises Kalligrammatidae, Psychopsidae, Osmylpsycho-pidae, and Aetheogrammatidae, and the adults are characterized by broad wings mostly with dilated costal space, branched recurrent veinlet, and richly branched veins. Lu *et al.* (2016) reported three psychopsoid species with siphonate mouthparts from the mid-Cretaceous Burmese amber, with descriptions of two new genera and species. However, the original publication (i.e. Lu *et al.*, 2016) of these new taxa was in Scientific Reports (an online, open access journal), without the ZooBank LSIDs. In this case, all new taxa published in Lu *et al.* (2016) are unavailable names based on the ICZN Amendments on e-publication (ICZN, 2012). Herein, we describe these two new genera and species for validation of these names.

The Burmese ambers investigated here originated from the Hukawng Valley in Tanaing Township, Myitkyina District of Kachin State, Myanmar. The age of this deposit has been dated at  $98.8 \pm 0.6$  million years using U-Pb dating of zircons from the volcanoclastic matrix of the amber (Shi *et al.*, 2012). All investigated specimens are currently housed in the Entomological Museum, China Agricultural University (CAU), Beijing. Type specimens will eventually be deposited in the Three Gorges Entomological Museum (EMTG), Chongqing (specimens available for study by contacting XL or WZ). Photographs and drawings were prepared using a Zeiss SteREO Discovery V12 stereo microscope system, a DM 2000 Leica microscope, and a Nikon D800 digital camera. Measurements were taken under a Keyence VHX-1000 microscope, equipped with a VH-Z20R lens. Morphological terminology of adult generally follows Aspöck *et al.* (1980) for the wing venation and Aspöck & Aspöck (2008) for the genitalia.

### Class Insecta Linnaeus, 1758

#### Order Neuroptera Linnaeus, 1758

#### Superfamily Psychopsoidea Handlirsch, 1906

#### Family incertae sedis

### Genus *Fiaponeura* **gen. nov.** (Figs 1–5)

*Fiaponeura* Lu, Zhang & Liu, 2016: 2. **nom. invalid.** Type species: *Fiaponeura penghiani* Lu, Zhang & Liu, 2016: 3. **nom. invalid.**

urn:lsid:zoobank.org:pub:6EBE80BD-0000-4675-84A3-CB0A7D5234D8

Received 05 June 2016, accepted 15 July 2016

Executive editor: Fuqiang Chen

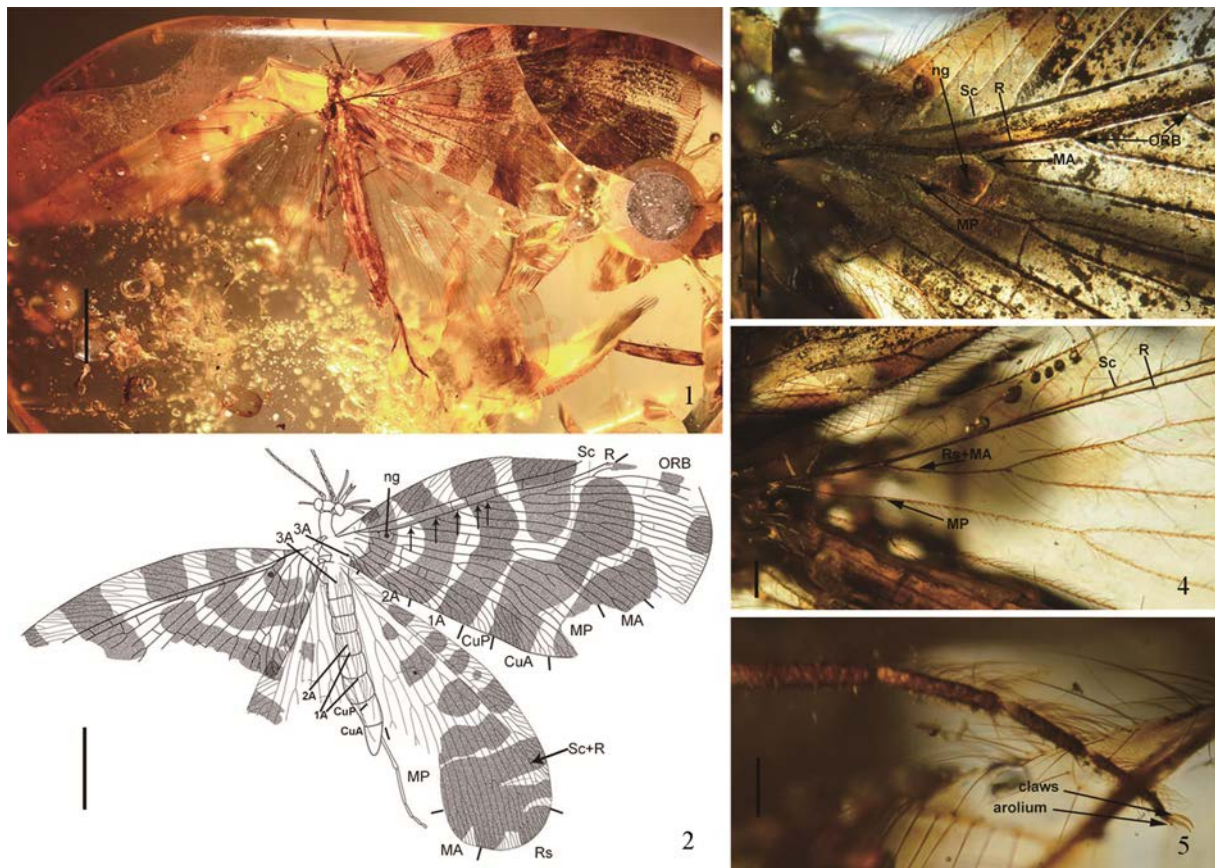


Figure 1–5. *Fiaponeura penghiani* **gen. & sp. nov.**, holotype male. 1. Habitus photo, dorsal. 2. Habitus drawing. 3. Photo of proximal part of forewing. 4. Photo of proximal part of hindwing. 5. Photo of foreleg tarsus. Scale bars: 1 = 2 mm; 2 = 2.5 mm; 3 = 0.5 mm; 4 = 0.2 mm; 5 = 0.05 mm.

**Diagnosis.** Medium-sized lacewings (forewing length about 11.59 mm). Head (Fig. 1) orthognathous, feebly domed dorsally. Compound eye with maximum diameter nearly equal in length to distance between inner margins of eyes. Ocelli absent. Antenna filiform, densely hairy, at least longer than length of head plus prothorax. Mouthparts composed of a bifid labrum, reduced mandibles, and conspicuously elongated maxillae and labium; maxilla with a long blade-like lobe putatively composed of galea or galea + lacinia, about 2/3 the length of maxillary palp; labium with elongated, distally bifid ligula, which is about 2/3 the length of labial palp. Pronotum about twice as long as wide, slightly narrower than head. Legs slender, each leg with a tibial spur. Wings broad, densely veined, with transversely band-like dark markings. Forewing subtriangular, with round distal margin; trichosores present on almost entire wing margin; a proximal nygma present; costal space narrow at base but distinctly broadened at middle, with a short simple humeral veinlet slightly bent to wing base, and with simple and forked costal crossveins, among which no interlink veinlet is present; subcostal space about 1/4 as wide as costal space at middle; four or five ORBs and MA diverging from R; MA dichotomously branched at middle; MP initially branched near wing base, with both main branches dichotomously branched; CuA distally pectinately branched, CuP dichotomously branched from midlength; a short, oblique mp-cua crossvein present; A1 dichotomously branched; A2 short, but pectinately branched; A3 bifurcated; two gradate series of crossveins proximad outer gradate series. Hindwing much narrower than forewing, ovoid, but strongly narrowed proximad; trichosores present along margin of distal half; a median nygma present between Rs and MA; Sc and R fused distally; single Rs+MA separating from R near wing base; base of MA oblique and slightly sinuate; MP probably dichotomously branched; CuA and CuP both distally pectinately branched; A1 straight with a marginal fork; A2 and A3 simple.

**Etymology.** The generic epithet is a combination of *Fiap* (FIAP = The Inter-Asian Philatelic Federation, which has long supported the author WZ's work on philately) and neural (plural form of the Ancient Greek noun neuron, nerve, vein, and a traditional ending of Neuroptera-like genera). Gender feminine.

**Remarks.** See Lu *et al.* (2016).

***Fiaponeura penghiani* sp. nov.** (Figs 1–5)*Fiaponeura penghiani* Lu, Zhang & Liu, 2016: 3. **nom. invalid.**

Diagnosis. Same as for the genus.

Description. See Lu *et al.* (2016).

Type material. Holotype. EMTG BU-001679, amber piece preserving an almost complete adult male of *F. penghiani* (wings partly not preserved), a beetle, and a midge; it is polished in the form of a flattened semi-ellipsoid cabochon, clear and transparent, with length×width about 30.7×17.8 mm, height about 3.7 mm.

Etymology. The new species is dedicated to Mr. Tay Peng Hian, currently the President of the Fédération Internationale de Philatélie (FIP), who over the years has encouraged author WZ to continue his philately.

Remarks. See Lu *et al.* (2016).**Genus *Burmopsychops* gen. nov.** (Figs 6–14)*Burmopsychops* Lu, Zhang & Liu, 2016: 6. **nom. invalid.** Type species: *Burmopsychops limoae* Lu, Zhang & Liu, 2016: 7. **nom. invalid.**

Diagnosis. Small-sized lacewings (forewing length about 7.7 mm). Head (Figs 6, 9) orthognathous, feebly domed dorsally. Compound eye with maximum diameter slightly shorter than distance between inner margins of eyes. Ocelli absent. Antenna moniliform, nearly half length of forewing, densely hairy. Mouthparts composed of a short, medially slightly concaved labrum, reduced mandibles, and conspicuously elongated maxillae and labium; maxilla with long blade-like lobe (putative galea or galea + lacinia), which is about 3/4 as long as maxillary palp with truncate tip; labium with paired, elongated, distally pointed ligula, which is about 3/4 as long as labial palp. Pronotum nearly as long as wide. Legs slender, tibial spur absent. Wings broad, moderately veined, immaculate. Forewing ovoid, distinctly broadened distad; trichosores present along distal half of wing margin; nygma absent; costal space rather broad except for narrow base, with a short simple humeral veinlet slightly bent to wing base, and with many costal crossveins distally forked except for some simple ones on

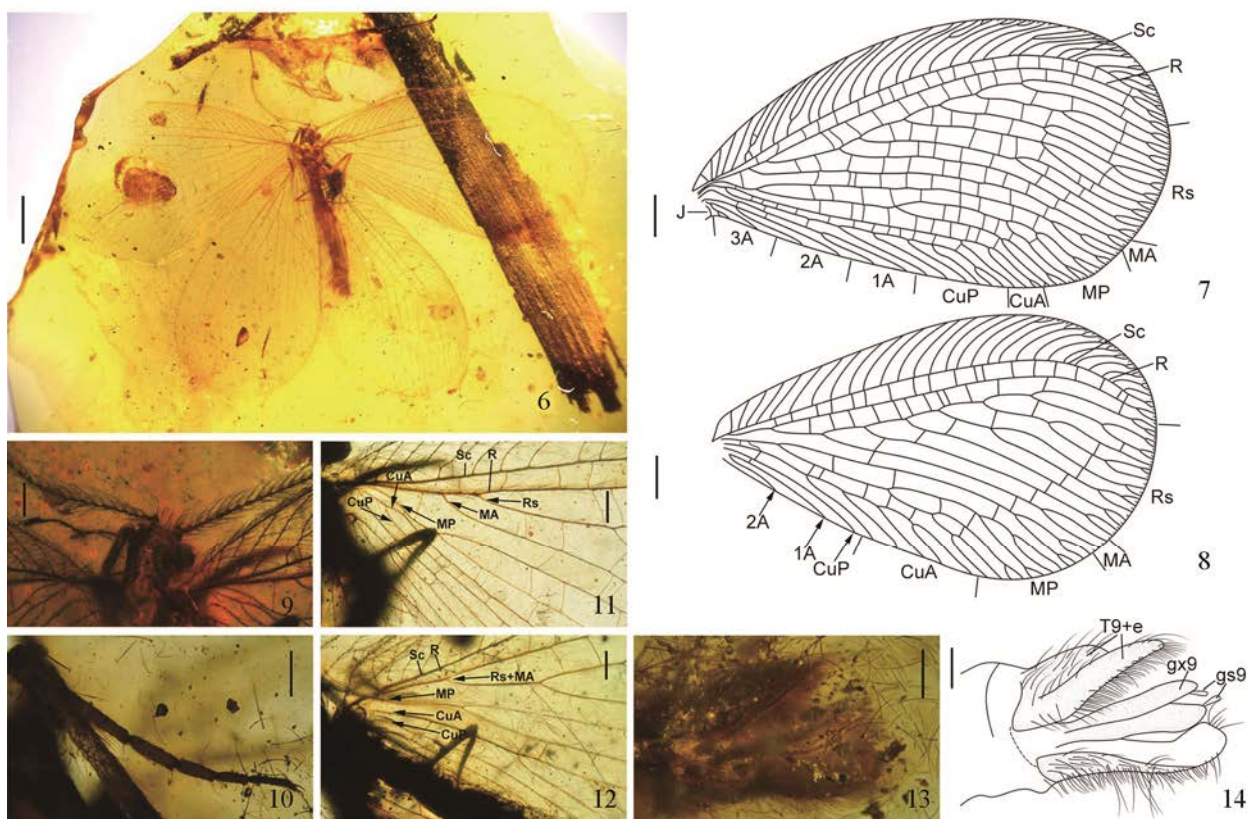


Figure 6–14. *Burmopsychops limoae* gen. & sp. nov. 6. Habitus photo, dorsal. 7. Forewing venation. 8. Hindwing venation. 9. Photo of head, dorsal. 10. Photo of hindleg tarsus. 11. Photo of proximal part of forewing. 12. Photo of proximal part of hindwing. 13. Photo of female genital segments, ventral. 14. Drawing of female genital segments, ventral. Abbreviation: T—tergite; e—ectoproct; gx—gonocoxite; gs—gonostylus. Scale bars: 6=2 mm; 7–8=1 mm; 9, 11–12=0.5 mm; 10=0.05 mm; 13–14=0.2 mm.



proximal half; subcostal space about 1/5 as wide as costal space at middle; distal parts of Sc and R distinctly curved posteriad but not fused with each other; Rs with seven main branches, each of which bears secondary forking and end-twigging, except anterior two branches only with end-twigging; MA diverging from R and bifurcated distad; MP initially branched near wing base, anterior branch bifurcated nearly at distal 1/4, posterior branch dichotomously branched from midlength; CuA trifurcated distad, CuP pectinately branched from midlength; A1 distally bifurcated; A2 and A3 deeply bifurcated near wing base; J short and simple; a number of crossveins present proximad outer gradate series. Hindwing slightly narrower than forewing, ovoid, but strongly narrowed proximad; venation primarily similar to that of forewing; single Rs+MA separating from R near wing base; CuP probably deeply dichotomously branched; CuA pectinately branched; CuP simple; A1 and A2 present, but simple.

Etymology. The generic epithet is a combination of *Burma* (Myanmar) and *psychops* (a common ending of Psychopsoidea). Gender masculine.

Remarks. See Lu *et al.* (2016).

***Burmopsychops limoae* sp. nov.** (Figs 6–14)

*Burmopsychops limoae* Lu, Zhang & Liu, 2016: 7. **nom. invalid.**

Diagnosis. Same as for the genus.

Description. See Lu *et al.* (2016).

Type material. Holotype. EMTG BU-001293, amber piece preserving a complete adult female of *B. limoae*, three cockroaches, and a lacewing larva; it is polished in the form of a flattened trapezoidal cabochon, clear and transparent, with length×width about 34.8×31.4 mm, height about 4.5 mm.

Etymology. The new species is dedicated to Mrs. Mo Li, who kindly donated the piece of amber that includes the new species.

## References

- Aspöck, H., Aspöck, U., Hölzel, H. 1980. *Die Neuropteren Europas: eine zusammenfassende Darstellung der Systematik, Ökologie und Chorologie der Neuropteroidea (Megaloptera, Raphidioptera, Planipennia) Europas*. Goecke & Evers, Krefeld. 495pp, 355 pp.
- Aspöck, U., Aspöck, H. 2008. Phylogenetic relevance of the genital sclerites of Neuropterida (Insecta: Holometabola). *Systematic Entomology*, 33: 97–127.
- ICZN. 2012. Amendment of Articles 8, 9, 10, 21 and 78 of the International Code of Zoological Nomenclature to expand and refine methods of publication. *Zootaxa*, 3450: 1–7.
- Lu, X.M., Zhang, W.W., Liu, X.Y. 2016. New long-proboscid lacewings of the mid-Cretaceous provide insights into ancient plant-pollinator interactions. *Scientific Reports*, 6: 25382. doi: 10.1038/srep25382.
- Shi, G., Grimaldi, D.A., Harlow, G.E., Wang, J., Wang, J., Yang, M., Lei, W., Li, Q., Li, X. 2012. Age constraint on Burmese amber based on U-Pb dating of zircons. *Cretaceous Research*, 37: 155–163.